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(71) Applicant(s)

G W Chemicals Limited

(Incorporated in the United Kingdom)

Ainleys Industrial Estate, Elland, HALIFAX,
West Yorkshire, HX5 9JP, United Kingdom

(72) Inventor(s)

Alan Geoffrey Gee

(74) Agent and/or Address for Service

Appleyard Lees

15 Clare Road, HALIFAX, West Yorkshire, HX1 2HY,
United Kingdom

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GB 2208659 A

GB 2204328 A

(58) Field of Search

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(54) Detergent dispenser

(57) An apparatus for dispensing a cleaning agent either liquid or solid takes the water used to add the agent from water already within the machine. The water may be recirculated to the dispenser by a peristaltic pump through an in-line suction filter. In one embodiment air may be injected into the water to displace the liquid agent from its container 50 before it is carried by the water to the interior of the machine via delivery channel 34. A spike 36 may be used to puncture the seal 18 of the inverted container 50. In another embodiment a tubular ring (not shown) with a plurality of holes provides a conically converging array of jets to dissolve a solid agent. The dispenser is suitable for any ware washing machine.

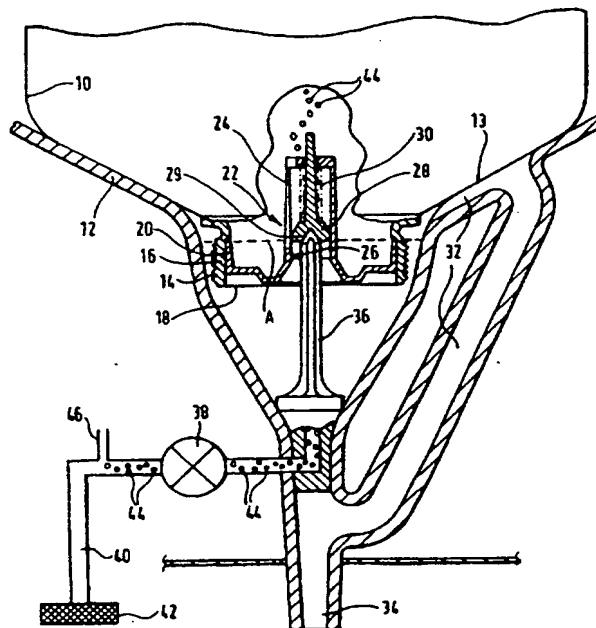


FIG.1.

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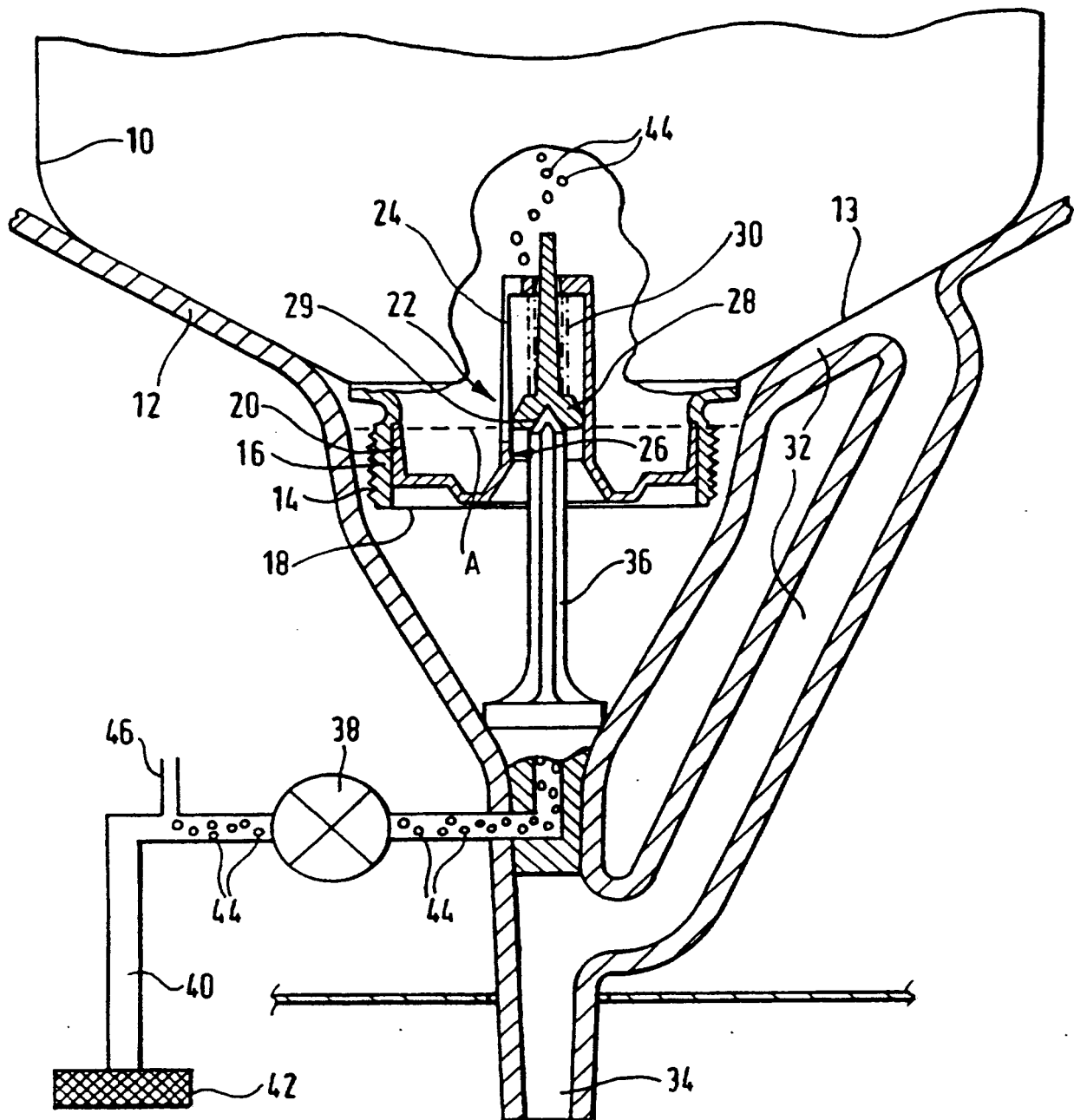


FIG.1.

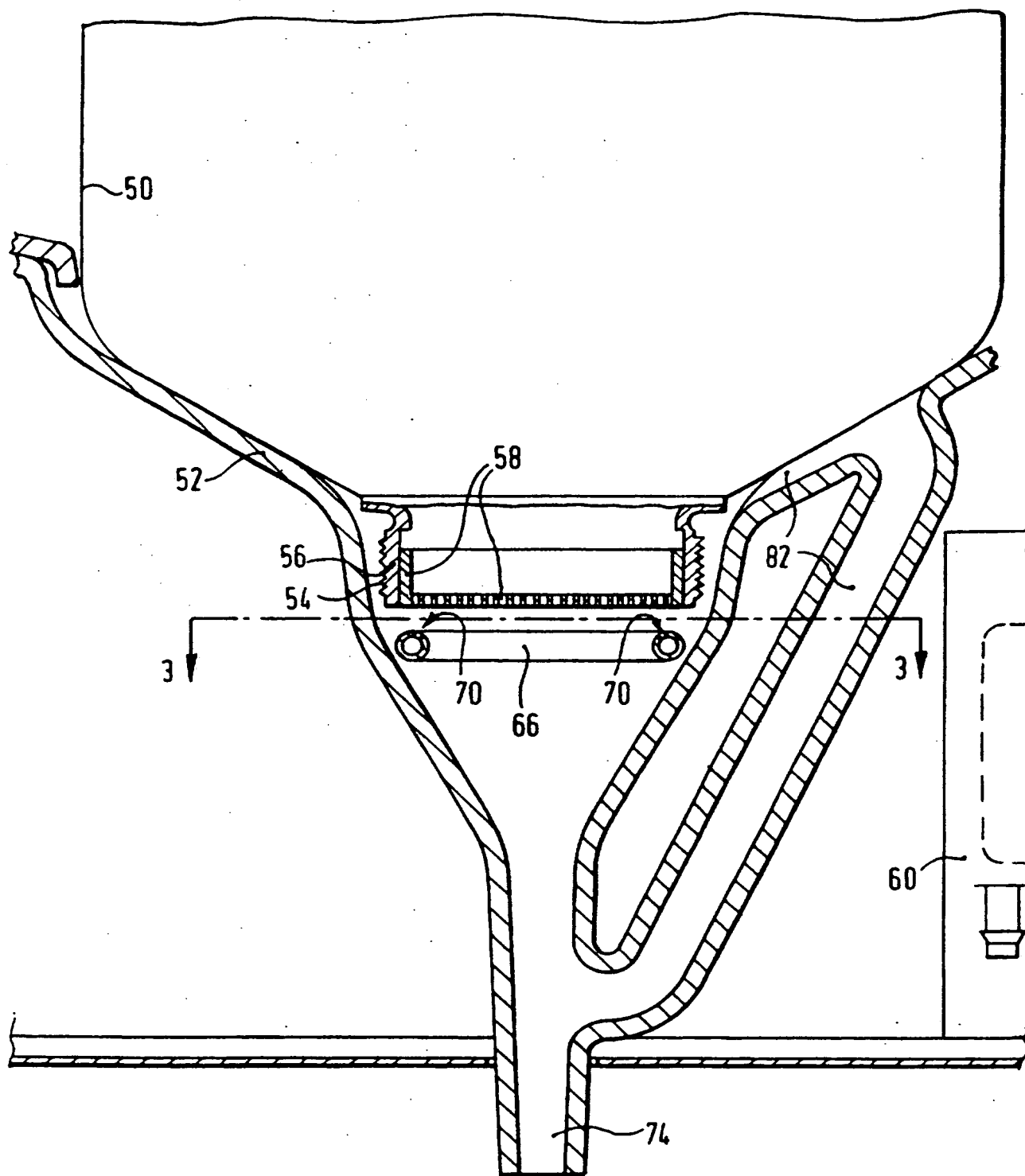


FIG. 2.

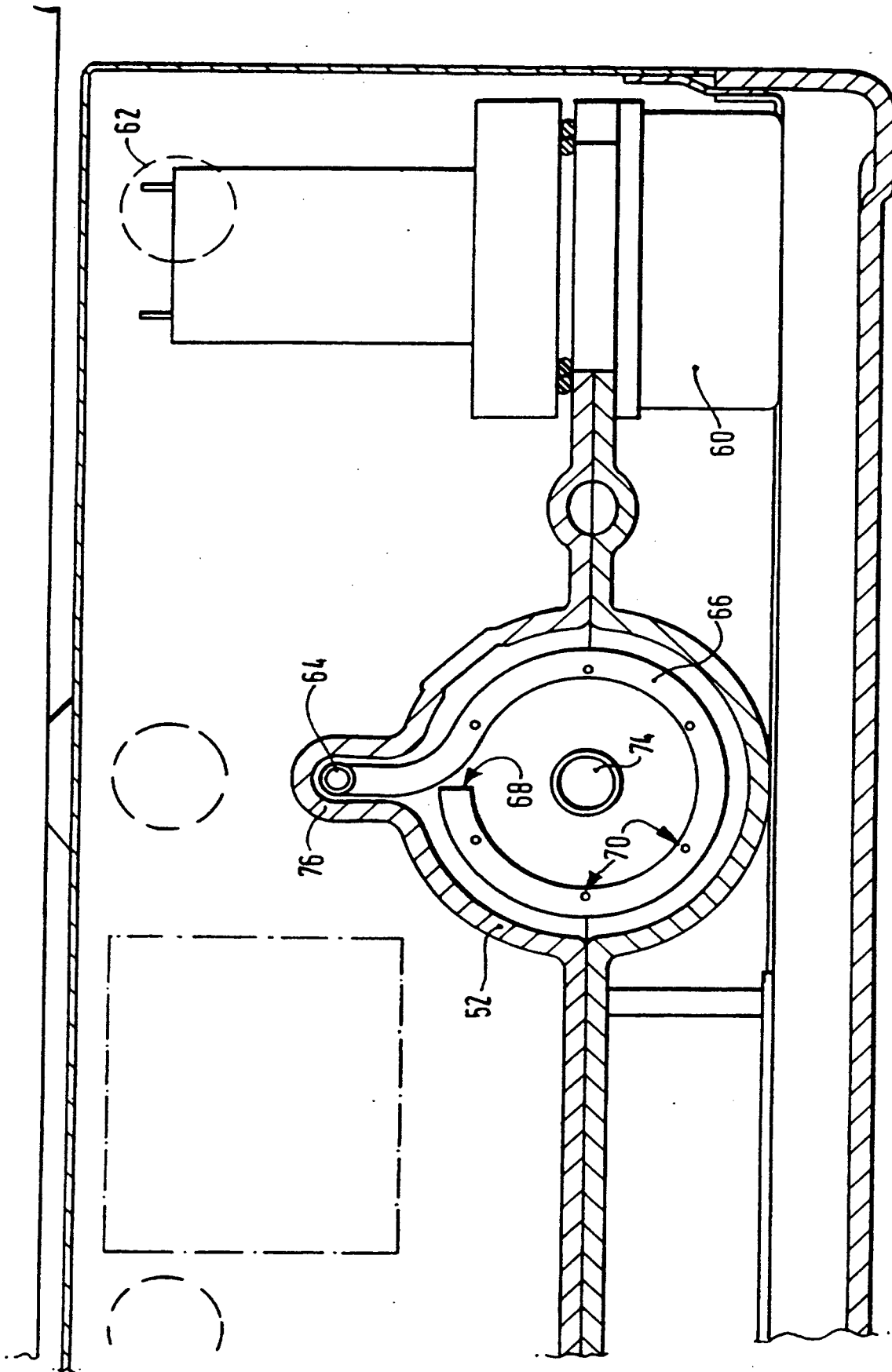


FIG. 3.

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CLEANING APPARATUS

5 This invention relates to apparatus for cleaning with water to which there is added a cleaning agent, and particularly, though not exclusively, to dishwashing apparatus of industrial type for use in large establishments such as hospitals, hotels, canteens and the like.

10 Hitherto, such apparatus has been restricted to using a cleaning agent of solid or powder type which has been dispensed from dispensing apparatus, by a single jet of water supplied directly from the mains. However, it is often very difficult to connect dispensing apparatus
15 reliably to the mains. Sometimes the pressure of mains water is very high and sometimes too low, requiring time-consuming setting-up procedures. Often its temperature is unsuitable, so requiring heating of temperature control equipment within, or upstream of, the dispensing
20 apparatus. Sometimes the mains pipe is buried in concrete and connecting the dispensing means to it is very difficult. Furthermore, it may be against regulations to connect such dispensing apparatus directly to the mains.

25 The principal object of the present invention is to avoid the above-mentioned disadvantages. Subsidiary objects are to provide more effective dispensing means, and to enable cleaning agents of liquid type to be efficiently dispensed by water.

30 According to the invention, there is provided apparatus for cleaning with water to which there is added a cleaning agent, in which apparatus, in use, the water for dispensing the agent is abstracted from the water
35 contained within the apparatus.

Preferably, the cleaning agent is progressively dispensed by said water.

5 Preferably, the water for dispensing the agent is delivered from within the apparatus by a pump.

Preferably, also, the pump is of peristaltic type.

10 Preferably, the water for dispensing the agent is delivered from within the apparatus by way of a filter.

Preferably, also, the filter is an in-line suction filter.

15 The cleaning agent may be a liquid detergent or liquid rinse-aid, in which case the water abstracted from that contained in the apparatus may be injected with air and delivered to a receptacle of the apparatus into which
20 receptacle the liquid detergent or rinse-aid is displaced from a container by said injected air, the displaced liquid detergent or rinse-aid being carried by said water to the interior of the apparatus.

25 Alternatively, the cleaning agent may be a powdered or solid detergent, in either of which cases the water abstracted from that contained in the apparatus is preferably delivered to means for directing a plurality of jets onto the agent.

30 Preferably, the means comprise a tubular ring having a plurality of holes.

35 Preferably, also, the holes are so arranged as to provide a conically-converging array of jets.

The apparatus is preferably a dishwasher. However, it could be another ware-washing machine, such as a clothes washing machine.

5 The invention further relates to a method of washing articles, comprising use of apparatus as herein defined.

Two embodiments of the invention will now be described, by way of example only, with reference to the
10 accompanying drawings of which:-

Figure 1 is a semi-diagrammatic sectional side elevation of liquid detergent dispensing means for an industrial dishwashing machine;
15

Figure 2 is a sectional side elevation of powdered or solid detergent dispensing means for an industrial dishwashing machine; and

20 Figure 3 is a section on the line 3-3 in Figure 2.

Referring now to Figure 1, an industrial dishwashing machine washes in conventional manner with a volume of, typically, 18 to 20 litres of water contained within it which has been supplied directly from the mains and heated to a suitable temperature, typically 55°C. Detergent is progressively dispensed from an inverted container 10 into a funnel-like plastics receptacle 12 and thence into the interior of the machine. In this embodiment of the invention the detergent is in liquid form and is dispensed by water. To this end, the container 10 has a removable cap (not shown) engageable on an external screw-thread 14 formed on its neck 16. Across the circular end of the neck, engaged thereon by an induction sealing method, is a metal/plastics foil laminate 18. A support housing 20
35

of a valve indicated generally at 22 is a push-fit in the neck 16, and said housing includes an aperture 24 and a seat 26 for a closure member 28 loaded by a spring 30. The receptacle 12 includes an outlet conduit 32 which
5 communicates by way of a delivery conduit 34 with the interior of the machine, and a vertical spike 36 is secured centrally within the receptacle 12. A peristaltic pump 38 abstracts water from that contained within the machine through a pipe 40 and an in-line suction filter 42
10 which strains out fragments of food. Air indicated by bubbles 44 is injected into the abstracted water through a tube 46.

In operation, the cap is removed from a container 10
15 of liquid detergent and said container is inverted and placed in the receptacle 12. The spike 36 pierces the seal 18 and opens the valve 22 by pushing the closure member 28 off its seat 26 against the action of the spring 30, as shown in Figure 1. Spillage of liquid detergent
20 from the container 10 during its inversion and placing in the receptacle 12, in particular spillage outside the dispensing apparatus, is thus prevented.

Water abstracted by the pump 38 from that contained
25 within the machine fills the receptacle 12 to the level of the top of the part of the aperture 24 uncovered by the displacement of the closure member 28. This level is indicated by the dotted line marked A in Figure 1. This prevents the liquid detergent simply flowing freely out of
30 the open valve 22. However, the air injected into said water enters the container 10 by way of the aperture 24 and bubbles up to the top of said container as illustrated. This forces liquid detergent to be displaced from the container 10 into the receptacle 12 whence it is
35 picked up by the flow of said abstracted water and carried

through the outlet conduit 32 and the delivery conduit 34 to the interior of the machine where it mixes with the water contained therein to perform the cleaning operation.

5 The embodiment of Figure 1 is well adapted for use with cleaning liquids, especially detergents, containing components which are sparingly soluble in water, for example sodium carbonate, and/or corrosive. This is due in part to the fact that, apart from the period just after
10 a new container has been located within the receptacle, diluted detergent rather than neat detergent is within the receptacle; and in part to the wide flow-path, not susceptible to blocking, for conducting the dispensed diluted detergent from the receptacle 12 to the interior
15 of the machine, which flow-path is provided by the outlet conduit 32 and the delivery conduit 34.

Referring now to Figures 2 and 3, an industrial dishwashing machine again washes in conventional manner
20 with a volume of, typically 18 to 20 litres of water contained within it which has been supplied directly from the mains and heated to a suitable temperature, typically 55°C. Powdered or solid detergent is progressively dispensed by water in known manner from an inverted
25 container 50 into a funnel-like receptacle 52 and thence into the interior of the machine. As in the embodiment of Figure 1, the water for dispensing the detergent is abstracted from the water contained within the machine. The container 50 has a removable cap (not shown)
30 engageable on an external screw-thread 54 formed on its neck 56 and in the case of powdered detergent there is provided a grid 58 which is a push-fit in the neck. A peristaltic pump 60 abstracts water from that contained within the machine through a pipe 62 and an in-line
35 suction filter (not shown) which strains out fragments of

food, and delivers it to a tube 64 which terminates in a ring 66 having a closed end 68. The ring 66 is disposed concentrically with and closely beneath the neck 56 and the grid 58 therein if provided, and has a plurality of
5 holes 70 formed in its upper side. The holes 70 are slightly inclined so as to provide a very slightly conically-converging array of upwardly-directed jets and are, typically, 1.5mm in diameter, and the rate of supply of water to said holes is, typically, between 0.2 and 2
10 litres per minute. The receptacle 52 includes an opening 74 which communicates with the interior of the machine, and said receptacle is shaped at 76 to accommodate an upright portion of the tube 64.

15 In operation, the cap is removed from a container 50 of powdered or solid detergent and said container is inverted and placed in the receptacle 52. Water abstracted by the pump 60 from that contained within the machine is delivered to the ring 66, and is sprayed in a
20 very slightly conically-converging array of upwardly-directed jets through the neck and the grid 58 therein if provided onto the detergent. Thus, there is furnished in effect a blanket of water which impinges at a slight angle on different segments of the detergent, so as to slice off
25 segments slightly at an angle towards the centre. The detergent is thus efficiently displaced from the container 50 into the receptacle 52 whence it is carried by the water through the wide plastics opening 74 which is not susceptible to blocking, to the interior of the machine
30 where it mixes with the water contained therein to perform the washing operation. It should be noted that in the unlikely event of a blockage occurring in the receptacle 52 beneath the container 50, parts 82 which served as the outlet conduit in the first embodiment are available to
35 serve as an overflow or auxiliary outlet conduit. A

sensor (not shown) may be provided in the overflow conduit to detect the occurrence, and a visual or audible indication may be given to the operator. In this embodiment, the overflow conduit connects to the outlet 34
5 adjacent to the lower end of the receptacle but in other embodiments it may connect further downstream, or even provide an entirely parallel pathway to the dishwashing machine.

10 The invention is also potentially applicable to other ware-washing machines, such as machines for washing clothes.

CLAIMS:

1. Apparatus for cleaning with water to which there is added a cleaning agent, in which apparatus, in use, the water for dispensing the agent is abstracted from the water contained within the apparatus.
2. Apparatus according to claim 1, wherein the cleaning agent is progressively dispensed by said water.
3. Apparatus according to any preceding claim, wherein the water for dispensing the agent is delivered from within the apparatus by a pump.
4. Apparatus according to claim 3, wherein said pump is of peristaltic type.
5. Apparatus according to any preceding claim, wherein the water for dispensing the agent is delivered from within the apparatus by way of a filter.
6. Apparatus according to claim 5, wherein said filter is an in-line suction filter.
7. Apparatus according to any preceding claim, wherein said cleaning agent comprises a liquid and said water abstracted from that contained in the apparatus is injected with air and delivered to a receptacle of the apparatus into which receptacle the liquid is displaced from a container by said injected air, the displaced liquid being carried by said water to the interior of the apparatus.
8. Apparatus according to any of claims 1 to 6, wherein said cleaning agent comprises a powdered or solid

detergent, and said water abstracted from that contained in the apparatus is delivered to means for directing a plurality of jets onto the agent.

5 9. Apparatus according to claim 8, wherein said means comprise a tubular ring having a plurality of holes.

10 10. Apparatus according to claim 9, wherein said holes are arranged to provide a conically-converging array of jets.

11. Apparatus according to any preceding claim comprising a ware-washing machine.

15 12. A method of washing articles, comprising use of apparatus as herein defined according to any preceding claim.

20 13. Apparatus substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

25 14. A method substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.



Application No: GB 9621919.1
Claims searched: 1-14

Examiner: David Glover
Date of search: 21 November 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.O): A4F, D1A
Int CI (Ed.6): A47L 15/44, D06F 39/02
Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2208659 A (UNILEVER PLC) see page 1 lines 1-3 & 35, page 2 lines 1-5 & claim 2 page 4 lines 9-13	X: 1-3, 8, 11, 12
X	GB 2204328 A (UNILEVER PLC) see page 1 lines 1-3 & 35, page 2 lines 1-5	X: 1-3, 11, 12

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